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Feature Story

Each month we provide a feature article on key industry trends and developments. Authored by a member of Intel's executive staff, the feature offers insightful information for product development, planning and execution.

Inside Looking In

Senior Technical Marketing Manager for Platform Technologies Tim Mostad gives you a fresh perspective on the latest technologies making their way onto Intel Architecture platforms. Tim lets you see the work through the eyes of the people making it happen and lets you hear what they really think. It's straight talk from developers to developers.

Top Stories

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On behalf of all of us at Platform Solutions, welcome to the future of the PC platform!

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Feature

Intel Mobile Technology Benefits Multiple Segments

By Robert Jecmen
Vice President
Intel Architecture Business Group
General Manager
Mobile/Handheld Products Group
Intel Corporation

Many users think that mobile systems are lower in performance than desktop PCs, useful for travel, but not in the office, and considerably more expensive than their desktop counterparts. None of these perceptions is true.

If you've ever shopped for a mobile PC, your purchase criteria probably included system performance, price and battery life. At the same time, if you're like the respondents to Intel's Online IT Survey, you're likely to have perceived mobile systems as lower in performance than desktop PCs, useful for travel, but not in the office, and considerably more expensive than their desktop counterparts.

None of these perceptions is true. Intel's mobile processor roadmap is closing the performance gap between mobile and desktop PCs. Multiple form factors enable mobile PCs to be used productively in the office, as well as on the road, and the industry is adopting the [Bluetooth](#) wireless connectivity standard that supports "anytime, anywhere" computing. Finally, prices for performance notebook PCs have dipped below \$2,000.

Intel® technologies and building blocks are contributing to all of these trends. The result is that for increasing numbers of users, the advantages of "anytime, anywhere" computing can translate into productivity gains and other Total Benefits of Ownership (TBO) that far outweigh the costs.

The Internet and TBO

The growth of Internet connectivity and the productivity benefits of an "anytime, anywhere" PC easily outweigh the 16 percent cost of ownership differential between performance mobile and desktop PCs (cost differential estimate by Compass America 1998). Compass America and Gartner Group data show that many companies are seeing productivity gains as high as 12 to 15 hours per month from their laptop users. The break-even point is just 1.5 hours of extra productivity per month. Additional gains can be reflected in a company's bottom line, not to mention the more intangible rewards of heightened employee satisfaction.

IT managers are discovering that advances in Mobile PC processor and graphics performance ensures a rich Internet experience. Other enhancements, including improved mobile PC manageability and swappable peripherals can improve platform stability and help to reduce support costs.

Intel Is Mobilizing

Intel is joining leading companies including PeopleSoft and Boeing by gradually adopting the mobile PC as its preferred client platform for employees. In fact, Intel has publicly announced that 80 percent of client systems will be mobile PCs by the end of 2001. The reasons include lower overall system and manageability costs, combined with higher performance capabilities and networking capabilities.

Designing for Performance, Size, Power and Cost

Now that we've seen why IT is moving to mobile systems, the question for developers is how to design high-performance mobile PCs that deliver near desktop performance with adequate battery life, in multiple form factors and price points.

Intel supports these requirements in four key areas:

- Performance—with fast [mobile Pentium® II processors](#) delivering speeds up to 400 MHz, the mobile Pentium III processor coming in the second half of 1999, and Intel's 0.18 micron process, the mobile PC processor roadmap is closing the performance gap with desktop systems. Mobile Pentium III processor-based systems with "Geyserville" technology will take mobile computing performance to a new level.
- Size and weight—low-voltage mobile Pentium II and [Intel® Celeron™ processors](#) bring a new dimension of performance and power savings to mini-notebook PCs. BGA and micro-BGA packaging support thinner and lighter mobile form factors while freeing valuable real estate.
- Battery life—Intel's Mobile Power Initiative, the [Intel® Mobile Power Guidelines 2000](#) and [Intel® Power Analysis Tools](#) help you deliver future mobile PCs that are high-performance, feature-rich and power efficient.
- Affordability—Intel provides processors, high-integration chipsets, mobile graphics chips and other platform building blocks that deliver optimum price/performance to all mobile PC segments. Intel's low-cost mobile chipsets, including the [Intel® 440ZX66M](#) chipset with AGP support, and the [Intel® 440MX chipset](#) with soft-audio/soft-modem technology, are specifically designed to reduce the cost of value mobile PCs. By providing support for Intel's [Wired for Management](#) technology, today's mobile systems are easier to support, manage and maintain in an enterprise-computing environment.

"Anywhere, Anytime" Computing Is Arriving

Intel has also been very active in the areas of wireless networking. The Bluetooth specification has been well accepted by over 500 industry participants and will take mobile PC productivity to new heights by allowing different devices to communicate with each other without being physically connected.

Making the Future a Reality with Mobile Technology

Intel provides the mobile processors, chipsets, graphic controllers, security features, drivers, power management and manageability solutions that can help you address the big three issues of mobile PCs: performance, battery life and cost. The convergence of Internet-based networking with wireless connectivity is taking mobile PCs in new directions. Stay up to speed with Intel mobile platform solutions, and you won't be left behind.

About the Author

Robert Jecmen joined Intel in 1976 and is presently vice president of the Intel Architecture Business Group and general manager of the Mobile/Handheld Products Group (MHPG). He has managed numerous programs in high-speed logic, SRAM, and nonvolatile memory technology development, manufacturing, and design. Most recently, Jecmen managed the 0.25 micron logic and flash technology development and manufacturing proliferation as well as the Intel® Pentium® II processor design. He holds two patents on high-performance transistor and multilevel metal technology.

For More Information

- [Intel® Mobile Computing](#)
- [Intel® Mobile PC Platform Solutions](#)
- [Bluetooth Technology](#)
- [Intel® Mobile Power Guidelines 2000](#)
- [Intel® Power Analysis Tools](#)

Inside Looking In

The Web: Part II

By Tim Mostad
Senior Technical
Marketing Manager
Intel Corporation

Along with a flood of information, the Internet brings the problem of having to sort the nuggets from the noise. The solution is user-friendly communication: tailoring the information to fit the reader.

Last month I wrote that the Web is not an annoyance, it's an opportunity to explore—at least for those wanting to profit from the current wave. By now I'm sure you've charted your course to the web. However, a few readers, maybe all the readers I have, wrote to ask that I provide more insight on which trail to take. While I can't speak for their specific needs I can tell you where my department is headed.

Along with a flood of information, the Internet brings the problem of having to sort the nuggets from the noise. On a large scale, this is sometimes called data mining. On the scale that most matters to me, it's called user-friendly communication. Many companies require their employees to submit weekly status reports to track issues, progress, or lack thereof. In a company as large as Intel, that many weeklies mailed to everyone with a need to know creates a lot of email traffic and a lot of over-communication. How do we begin to tailor information to fit the reader?

One idea is to borrow the best of the Internet and mix it with a few handy features of Windows. Cookies plus expandable branches are enough technology to get us started.

In Windows* Explorer, when you're interested in a particular sub-directory, you expand the branch until you get to what you want. The next time you visit at the directory, Explorer takes you to that same spot, and it looks the same as it did when you left it. If you access the same directory frequently, this feature is a real time saver, simple but effective. If we could write our status reports with descriptive topics as expandable branches then our readers wouldn't have to pick through a page or two of "noise" to get to the critical information. They'd simply find the major topic that seemed interesting, then double click to expand it, and so on until the priceless gem was uncovered.

Calling cookies the "best of the Internet" may be a stretch, but in the right situation they prove to be invaluable. A cookie is an HTTP header that consists of a text-only string that's passed into the memory of your browser. This string contains the domain, path, lifetime, and value of a variable. If the lifetime of this variable is longer than the time the user spends at your site, then this string is saved to a file for future reference. The next time that same website is accessed, the site will ask the browser for the cookie, then configure itself to better suit the visitor. Cookies are especially handy since they're small and don't pose a significant security risk.

When your now-enlightened status report reader leaves your personal site, the browser could pass back a cookie identifying the particular view that individual wanted. Next week or month or whenever your status is posted again, that person will open your report to a familiar—and more useful—spot.

I've conveniently omitted a few details. To provide this kind of functionality, we have to keep a consistent format for our department's reports. Internally we've begun to adopt templates that eliminate the need to do formatting. The report writer simply fills in the template and then posts it. We wrote the server program that takes care of the rest, such as dealing with cookies and expanding the appropriate branches to create the custom view.

Of course, error handling is what makes most programs actually useable. In the scheme I've just described, very few conditions need to be handled, including what to do if a particular branch has no information this time or what to do if the template changed since the last access. Any enterprising programmer will be able to take care of these and more.

Okay, so this Internet expedition didn't discover something as impressive as a new continent. We just applied a small amount of lateral thinking coupled with some old fashioned engineering to solve a simple but growing problem. When you start regarding your own information as Internet information, a path to the Web becomes clearer. After all, you spend so much time making sure your status report is accurate and readable, shouldn't you spend some time making sure it's actually read? Put a hit counter on your report sections to figure out what sections receive the most visits and your readers will automatically provide the feedback to keep you on course.

Maybe your company isn't as large as Intel. Maybe you receive a manageable amount of material. Maybe you can take the time to read everything that might affect your daily life. Even so, a simple idea like this can make a world of difference on your impact to the organization. My point last month was to encourage you to pioneer these kinds of opportunities. So seek out the little things that will make the difference, and apply your imagination. In a lot of cases all it takes is connecting the technology dots and using emerging Internet technology and the picture will start to look like a navigation chart to the stars.

As a footnote, when I was researching this project, I discovered that someone in the Intel® Architecture Labs had already prototyped something very similar several years ago. It happens that the idea was scrapped, lest we anger a certain software company. At the time, it would have been difficult to envision Intel producing ANY usable software. I am happy to say it seems we've found our course and today have some very successful products with significant software components. Whenever you start to innovate, you are likely to get lost in uncharted territories, too. Don't give up easily. In our case, the engineer who was on the right vector eventually left the company and the prototype code base was erased, so we had to start from scratch years later. As with so many great discoveries, it's not always enough just knowing where you want to go but also having the courage to stick with it until you get there.

About the Author

Tim Mostad says, "the majority of my 18 years at Intel have been spent in the pursuit of technical marketing nirvana." He is responsible for demos, white papers, plugfests, and technical training to support the adoption of new desktop technologies.

Focus

Measuring and Analyzing Graphics Performance with IPEAK

By Paul Parenteau
IPEAK Technical Marketing Engineer
Platforms Tools Operation
Intel Corporation

Discover how IPEAK (Intel® Performance Evaluation and Analysis Kit) tools improve analytical and diagnostic capabilities in performance tuning for next-generation PCs.

[IPEAK](#) (Intel's Performance Evaluation and Analysis Kit) tools significantly improve the analytical and diagnostic capabilities inherent in platform integration and performance tuning for the next generation of personal computers.

Intel Architecture Labs engineers developed IPEAK to help ease technology adoption issues for PC original equipment manufacturers (OEMs), independent hardware vendors (IHVs) and independent software vendors (ISVs). This tool is composed of seven toolkits designed to improve PC platform performance in the areas of storage, power management, I/O functionality and graphics performance. Two of the seven tools, the [Graphics Performance Toolkit](#) (GPT) and the Intel Baseline AGP System Evaluation Suite ([IBASES](#)), are specifically targeted at developers of advanced graphics applications and the related hardware platform products that run them.

The IPEAK Graphics Performance Toolkit

The IPEAK Graphics Performance Toolkit enables OEMs, IHVs and ISVs to analyze the performance characteristics of graphics controllers and graphically rich applications in ways that help to optimize the performance of their hardware and software products. Equally important, the toolkit can be used to analyze the content characteristics of advanced graphics applications. As such, the GPT enables IHVs to develop hardware to match the needs of the next generation of graphics applications while at the same time allowing ISVs to create applications that take full advantage of the latest graphics hardware technology.

The IPEAK Graphics Performance Toolkit is unique in that it operates directly on the actual graphics applications being tested. For the first time, developers need not measure synthetic workloads to tune their graphics subsystems or software. Armed with this advantage, GPT measures the three primary indicators used today to determine 3D graphics performance—frame rate, triangles and pixels—all of which are measured as a function of time, typically performance per second.

Measuring True Graphics Performance

In essence, the Graphics Performance Toolkit "snoops" calls to such popular PC graphics APIs as DirectX* and (coming soon) OpenGL*. It times the various routines, collects information, and logs and graphically charts that information for use by the engineer. For example, a developer can launch a 3D application from GPT and obtain instantaneous frame rate charting of the application's throughput. This provides valuable insight into the processing flow of the application (see Figure 1), to assist in debug activities.

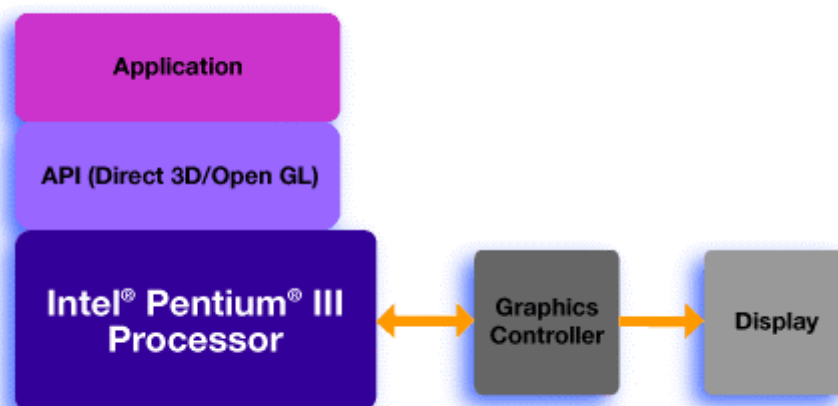


Figure 1: Application Processing Flow

The frame rate measured in frames per second (fps) is the basic metric of graphics software performance. Most applications provide the ability to calculate a frame rate mean averaged over a number of frames. While these calculations have been sufficient for software rendering, this kind of mean measurement is too coarse for measuring the performance of an accelerated application. In addition, the "whole pipeline" frame rate derived from this approach can be subject to interference in the rendering pipeline. In order to achieve the best possible measurement, a per frame or instantaneous frame rate (iFPS) must be calculated, which reflects the actual amount of time required to hand off a frame of workload from the application to the accelerator (see Figure 2).

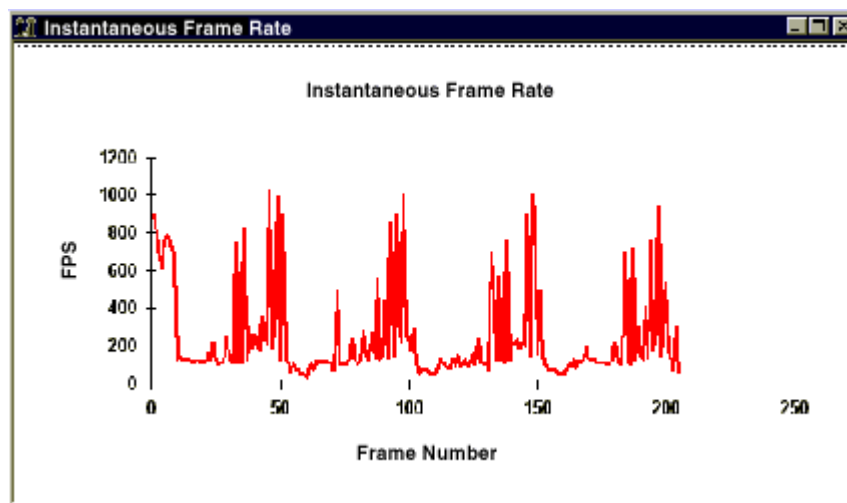


Figure 2: Instantaneous Frame Rate

GPT provides the ability to calculate iFPS, as well as to deconstruct the accelerated pipeline, by providing full API coverage and instrumentation against the DirectX* and OpenGL* APIs. This allows GPT to intercept, log, modify or deflect API functions called from an application, enabling developers to more fully understand the performance of the application and its workload.

For OEMs, the IPEAK Graphics Performance Toolkit is more than just a tool to tune their graphics subsystems. By working directly with real applications, the toolkit gives OEMs a way to help determine which software they want to include in their system bundles, and how to make that software run with optimal performance. Similarly, ISVs can enhance the value and attractiveness of their applications by using the Graphics Performance Toolkit to tune and improve performance.

Intel Baseline AGP System Evaluation Suite

Complementing the GPT test suite is the Intel Baseline AGP Systems Evaluation Suite (IBASES), which typically is used by IHVs to verify AGP functionality and performance. For game developers, IBASES demonstrates AGP acceleration for different graphic API sets, including DirectX* and OpenGL*. In order to verify maximum performance of the AGP subsystem, IBASES uses a synthesized texture workload that verifies whether the OS driver functions well with AGP memory, determines if the AGP adapter is capable of accelerating AGP applications, and ensures that all application performance tuning opportunities have been utilized.

The latest release of IBASES includes additional stress loading for AGP 4X implementations, inclusion of Charting Texture Test performance data, image rotation for host loading, and OpenGL* 1.1 Texture acceleration support.

Breaking New Ground

As the first offerings of their kind in the industry, the IPEAK tools help shorten product time-to-market cycles during the process of adopting new platform technologies and standards. As with all IPEAK offerings, the [Graphics Performance Toolkit](#) and [IBASES](#) provide a way for developers to optimize their Intel Architecture-based hardware and software solutions. The ultimate beneficiaries of these relationships are end users, who can look forward to enjoying advanced and graphically rich computing experiences with today's leading-edge PC platform technology.

About the Author

Paul Parenteau is a Staff Technical Marketing Engineer in Intel's Platform Tools Organization. He works with Intel Engineering groups to create useful tools to help accelerate the adoption of platform technologies by the PC industry.

For More Information

For details and free evaluation copies of Intel's IPEAK tools and toolkits, please visit the [IPEAK](#) Web site.

Top Stories

A Framework for DVD-Audio Content Protection

By Bill Pearson
Technical Marketing Engineer
Intel Corporation

DVD-Audio will eventually replace CDs, and many studios are planning releases on this new format in the near future. Because making digital copies produces perfect replicas of the original, music producers need a practical content protection framework.

DVD-Audio is slated to be the next generation of digital audio, eventually replacing Compact Disk (CD). Many studios are planning releases on this exciting new format in the near future. Studios need the ability to protect their content because making digital copies is easy and produces perfect replicas of the original work. A method for protecting the content from copying is a critical prerequisite to the widespread deployment of this new standard.

Following months of discussions with the world's five leading music companies (BMG, EMI, Sony Music Entertainment, Universal Music Group, and Warner Music Group), IBM, Intel, Matsushita Electric (Panasonic), and Toshiba recently announced a jointly-developed content protection framework for DVD-Audio. This article provides an overview of that framework.

How It Works

DVD-audio content protection employs a CSS (Copy Scramble System)-style license arrangement. What this means is that content on the disk is encrypted, and decryption includes watermark detection and requires adherence to licensing and compliance rules.

The content protection framework allows content owners to specify four parameters:

- C—the permitted number of copies
- Q—the quality allowed for each copy
- R—any related content, such as song lyrics and liner notes
- T—a transaction parameter that allows for online or other transaction authorizations.

DVD media must carry these four parameters along with the audio content. The player and the recorder must support them as well. The parameters provide flexibility, without compromising the security of the content.

Now let's explore watermarking and each of the four parameters in greater detail.

Watermarking

Watermarking is a method of transmitting content-related information along with the content, without noticeably affecting content quality. In the DVD content protection framework, watermarking indicates the C, Q, and R parameters.

When the content is copied, compressed or otherwise manipulated, the watermark remains detectable. New content can be watermarked, at the content owner's preference. In-the-clear and analog inputs to participating recorders are subject to watermark detection and response.

C—Number of Copies

The framework allows for a single-copy generation method, like SCMS (Serial Copy Management System). Once a copy has been made, the copy is marked No More Copies. The compliance rules limit the number of copies to one per recorder, unless more copies are specifically allowed. By specifying a value for C, the content owner sets the number of copies allowed per recorder at a given sound quality Q. Copies must be encrypted, with the exception of “legacy” systems, which are allowed to make real-time recordings in the clear at CD-quality or less.

One interesting fact: the C parameter is enforced on a song-by-song basis. ISRC (International Standard Recording Code) is a code that uniquely identifies each song title. The recorder stores ISRC codes of copied titles and will not record any ISRC code more times than specified by C. If there is no ISRC code on the disk, the recorder assumes it is allowed to make only one copy generation.

Q—Sound Quality

The Q parameter specifies the sound quality of copies. Although legacy copying is permitted, sound quality is limited to CD-quality or less, defined as 48-KHz sample-rate, 16 bits, and 2 channels. The content owner may also choose to allow full-quality, 2-channel copies, or to allow multi-channel copying.

R—Related Content

The R parameter allows the content owner to specify the use of non-audio content on the disk, including Web links, liner notes, pictures, video, and anything else that the content owner puts on the disk. For example, if the song lyrics are placed on the DVD, the content owner can specify whether the lyrics can be copied or not.

T—Transaction Authorization

The transaction parameter indicates that online or other authorizations may be used. For example, if a content owner allows only a single copy of the DVD, an end user might be allowed to purchase the right to make a second copy of the content. This can be done through a Web site or another communications method.

Benefits for Recording Companies, Content Owners, and Consumers

The goal of the DVD audio content protection framework is to foster the acceptance and deployment of DVD media by balancing the interests of the consumers, device manufacturers, and content owners. Together, watermarking technology and the C, Q, R, T parameters create a robust content protection mechanism, while maintaining both the consumers's right to make a single copy of audio material and the efforts of content owners to differentiate their products.

About the Author

Bill Pearson is Intel's content protection technical marketing engineer. He works within the PC, Consumer Electronics, and recording industries to help enable the adoption of Digital Content Protection technologies, and manages Worldwide Content Protection Plugfests, which promote interoperability. He can be reached at bill.pearson@intel.com.

For More Information

Stay tuned to this magazine for more information on this exciting technology.

Pre-boot User Authentication Architecture Prevents Theft of Mobile PC Assets and Data

By Naveen Musinipally
Platform Marketing Program Manager
Intel Corporation

By Luke Girard
Senior System Architect
Intel Corporation

Even if you keep your valuables in a safe, you also probably have a lock on your front door. The same thinking should apply to your PC and data stored on it. Protecting valuable data and assets starts with keeping the wrong people out of your PC.

Even if you keep your valuables in a safe, you also probably have a lock on your front door. The same thinking should apply to your PC and data stored on it. The rapid increase in deployment of mobile PCs in corporations makes data and asset security an especially important issue. This is because mobile systems typically operate outside corporate firewalls, and the PC themselves can be lost or stolen.

Like the lock on your front door, pre-boot user authentication (UA) architecture can keep unauthorized persons from ever getting inside a mobile computer or its hard disk drive (HDD). It provides an important first line of defense for notebook users, especially in enterprise environments. This article provides a conceptual overview of a proposed architecture for pre-boot user authentication that is now under development at Intel.

Building Trust in Mobile PCs

The growing popularity of mobile computing makes mobile PC security a vital issue for IT managers and users, and by extension for OEMs of mobile PCs. An overview of the mobile PC landscape shows why building trust is so important.

Data and intellectual capital valued at billions of dollars (Chubb Group 1998) is now being carried inside mobile computers. Protecting data and assets against theft is important. Unauthorized persons should not be able to get inside these systems.

The growing popularity of virtual private network (VPN) technology means that users are exchanging proprietary data over a public network infrastructure beyond corporate firewalls. And of course we have all heard statistics describing the growth of e-commerce. In both these areas, it's important to be able to trust the identity of the person at the other end of the pipe.

Pre-boot User Authentication at a Glance

Here's a quick overview of how pre-boot user authentication works (see Figure 1).

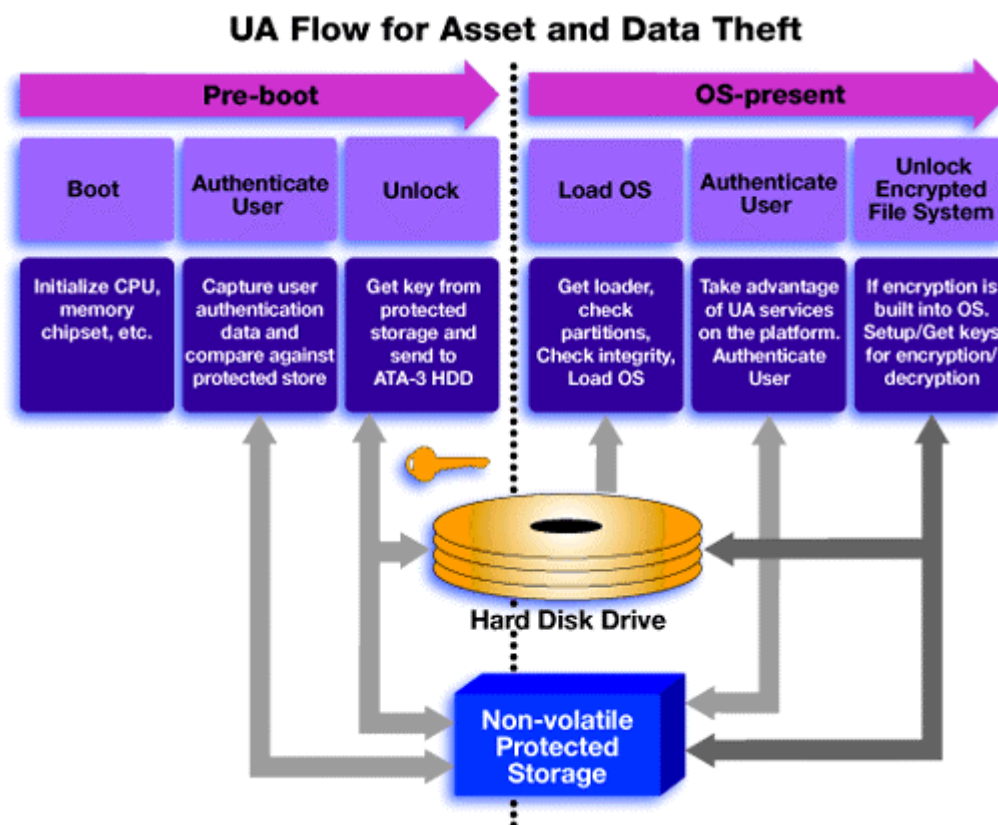


Figure 1: An example flow for user authentication

The system initializes the processor, chipset, memory, and other platform components. The user is then required to authenticate to the platform using a fingerprint (or other biometric), USB (Universal Serial Bus) token, smart card, or some other authentication device. In addition, the traditional passphrase or personal identification code (PIN) may be required to provide multiple factors of authentication.

Next, since the user has now been authenticated and the required level of trust between the user and the platform has been established, the password-protected hard disk drive (HDD) would be automatically unlocked. This is accomplished by retrieving the HDD key from non-volatile protected storage on the platform. One advantage of this approach is that the key that's used to unlock the HDD can be much longer, and even random, since the user doesn't have to remember it.

Once the operating system (OS) loads, it uses the "User Authentication Services" software on the platform to communicate with non-volatile protected storage, and authenticates the user to the OS. If encryption is built into the OS, it obtains the appropriate encryption/decryption keys from the non-volatile protected storage. The PC is then ready to use.

The Advantages of Pre-B Authentication

Pre-boot user authentication provides a practical way to verify that persons who boot-up the PC platform are authorized to use it. Here are the advantages:

It provides a lock on the front door—the BIOS is the first code block on the platform to execute every time power is turned on. Using this approach, biometric and other authentication devices, which are typically available only after the OS has loaded, can now be used pre-boot as well. Putting security services in the pre-boot space prevents unauthorized persons from getting the PC to boot.

It works better than conventional BIOS password protection—conventional BIOS passwords are not only vulnerable to being “hacked” by intruders, many mobile PC users never turn them on, or simply don’t know how.

- It’s easy to use—implementations of pre-boot user authentication can eliminate the need for users to remember multiple passwords.
- It can work across all PC platforms—the proposed pre-boot user authentication architecture works equally well on desktop and mobile platforms, simplifying deployment and support.
- It enables management and remote access—this architecture provides the pre-boot infrastructure necessary to execute challenge/response protocols over a remote connection. This area will be the focus of a future article in this magazine.

Where the Technology Is Today

Pre-boot user authentication is an important consideration for any mobile (and desktop) PC OEM that markets products to enterprise users. Intel is now working to develop the pre-boot user authentication architecture and make it available to the industry, along with technical collateral, development kits, and reference designs.

Intel’s objective is to provide OEMs with a pre-boot user authentication architecture that is independent of the BIOS, device, operating system, and bus. By providing users with a lock on the front door of their PCs, pre-boot UA will help build a degree of trust that is a vital prerequisite to the continued widespread deployment of trusted PC platforms.

About The Authors

Naveen Musinipally is a program manager for security in Intel Corporation’s Mobile and Handheld Products Group.

Luke Girard is senior system architect in the Mobile and Handheld Products Group, responsible for platform security architectures.

For More Information

Plan to attend Fall '99 [Intel Developer Forum](#) for technical information on Pre-B UA Architecture.

Watch for in-depth technical articles in future editions of this magazine.

RealText* 3D: Fonts and Effects with a Message

By Jerry Weber
Senior Product Marketing Manager
Intel Corporation

Intel and RealNetworks are delivering technology that allows developers to easily incorporate eye-catching 3D text and effects into Web-based multimedia. Here's what you should know about RealText 3D.*

Multimedia is arriving on the Internet and delivering the kinds of graphically rich PC experiences that CD-ROM first made famous in the mid-90s. Vector graphics technologies, including Macromedia Flash*, streaming video solutions from RealNetworks and Apple*, and 3D formats from Intel and MetaCreations are now revolutionizing the Web experience.

Intel and RealNetworks are working together to deliver technology that allows developers to easily incorporate eye-catching 3D text and effects into Web-based multimedia. In May, Intel and RealNetworks announced RealText* 3D, a low-bandwidth, client-based solution for creating 3D text over the Web. Intel® Architecture Labs (IAL); Internet Media Initiative is licensing Web Design Effects (WDE) Software to RealNetworks, which offers RealText 3D as a plug-in to the RealSystem G2 media player.

Busting the Bandwidth Barrier

While the Web is a supreme new medium for education, entertainment, commerce, and communication, the low-bandwidth connections used by most consumers have been a barrier to the widespread deployment of rich and engaging content. Content using 3D has been avoided because the large size of 3D models has contributed to the infamous "world wide wait."

For example, if you want to create smooth animation with a text message of 10 characters, merely moving the text from right to left, rotating it, and moving it up and out of view requires about 250 Kbytes as an animated GIF. You could always use video, but when you compress it to send it across the Web, it loses quality.

The technology in RealText 3D minimizes the wait on the Web by utilizing the power of the client's processor to produce low-bandwidth, high-quality 3D text with animation and effects including twists, melts, fades, and wipes. The power of Intel® Architecture processors, especially the Intel® Pentium® III processor, can enable great video and 3D content, regardless of the speed of the Internet connection. With RealText 3D you can achieve great animation and graphic quality with files typically smaller than 5 Kbytes.

The First Streaming 3D Solution for Fonts and Effects

RealText 3D produces 2D or 3D text generated on the client from an ASCII string sent by the server. It can use any TrueType* font available on the system and includes fallback options if the font isn't available.

You can use RealText 3D to animate text in any direction (including the Z-axis). Text can be rotated and scaled, twisted, melted or modified with a field effect. What's more, multiple text elements can be active in the same window at the same time. You can use lighting effects to provide shadows, colors, and reflections in addition to scene transitions such as fade and wipe.

Scalability to the Pipe, and the Processor

One of the biggest advantages of RealText3D is its ability to scale to the user's Internet connection and to the speed of the client processor. The technology eliminates the wait for downloading the geometry because the user downloads the instructions for the 3D text, not the geometry itself. Data sent to the client is dynamically changed and details contained in the data are prioritized, based upon the capacity of the client's connection. The processor in the user's system then produces the 3D text and the animation. Data sent to the client meets the capability of the processor, and the client system processes data, based upon its capabilities.

Of course, faster processors and better 3D graphics cards produce higher quality rendering through more polygons and enhanced lighting effects with higher frame-rate animation. The performance capabilities of the client PC are determined at runtime, enabling the delivery of optimal rendering quality and performance.

SMIL-Based Architecture

The Synchronized Multimedia Integration Language (SMIL)-based architecture of RealPlayer G2 offers an outstanding opportunity to enhance user experiences with 3D text and effects. SMIL is a layout language that allows easy creation of multimedia presentations consisting of multiple elements of compelling music, voice, images, text, video, and graphics in a common synchronized timeline.

A proposed specification of the World Wide Web Consortium (W3C), SMIL provides a way of producing rich and interactive multimedia content for real-time delivery over the Web, even over low-bandwidth connections.

Available Free: A Content Developer Kit (CDK)

RealText 3D is based on XML extensions. A small number of tags are used to define the text, animation, effects, and lighting. RealNetworks is making available, free of charge, a [Content Developer Kit](#) (CDK) that includes an authoring guide with a complete language description, a RealText 3D text editor to help build presentations, and a series of samples and example code.

Intel's Role

The agreement between Intel and RealNetworks is an example of how Intel® Architecture Labs (IAL) works to deliver make rich media experiences pervasive across the Internet. Intel is working with leading companies such as RealNetworks to create solutions that provide new and enhanced experiences for users of Intel® Architecture PCs.

So Why Wait?

Content owners can use advanced media to "attract eyeballs" and make their sites more engaging and compelling. As the competition among Internet sites heats up, rich media provides the edge needed to attract and retain consumers. Client-based technologies that use the power of the processor for media eliminate the wait for large files to download, providing consumers with a more compelling experience that keeps them from losing patience and clicking-off the Web site.

RealText 3D lets developers differentiate their RealPlayer G-2 Multimedia content with new capabilities and add punch to text messages. Scalable client-based effects and 3D text won't eat up bandwidth, maximizing quality and frame-rate, while at the same time minimizing the wait for consumers. Moreover, RealText 3D effects integrate well with existing SMIL media, and low-bandwidth effects leave room for streaming other data.

Continuing advances in Intel® Architecture are dramatically enhancing the power of the PC. RealText 3D and other scalable client-based effects can make this PC power the foundation of a richer Internet experience for content owners and millions of consumers.

About the Author

Jerry Weber, much to his surprise, was born into a media-rich world of sights, sounds, and interactivity. He has endeavored for the last 11 years to bring this “real world” and a bit of the imaginary world into the homes of consumers through cartridge, CD-ROM, and Internet software for computing devices. He is currently focused on developing low-bandwidth solutions for client-generated animation and 3D.

For More Information

You can download the RealText 3D Client Plug-In, the Content Developer Kit (CDK), and the server component from the [RealNetworks](#) Web site.

Check out [Intel® Web Design Effects](#) software and the other Intel® Optimizers for Internet media.

Intel® Motherboards: Helping Developers Provide Safety, Security, and Reliability

By Steven L. Ashby
Senior Product Marketing Engineer
Intel Motherboard Division
Intel Corporation

By Alex Quach
Senior Product Marketing Engineer
Intel Motherboard Division
Intel Corporation

Intel's motherboards have long been recognized for outstanding reliability and performance. They now come bundled with anti-virus and Internet protection software that raise the bar even higher.

Intel® motherboards have long been recognized for their outstanding reliability and performance. Bundled anti-virus and Internet protection software help to raise the value-added bar even more.

Ever since the early 1990s, Intel has been actively involved in the design and sale of system motherboards—not only for PCs, but also for servers and workstations. Over the years the company has generally maintained a low profile in publicizing its motherboard offerings, focusing instead on the larger issues entailed in enabling general advances in motherboard design across the industry.

The next generation of form factors and system designs continues to push the envelope of the desktop PC. More than just a vehicle for Intel processors, Intel motherboards have risen to the fore as an ideal choice for platform developers—not only because of their performance, but also because of their reliability. That reliability has been strengthened with the announcement that Intel motherboards now come bundled with anti-virus and Internet protection software, enabling system integrators to provide their customers with more complete and value-added solutions than ever.

Rock-Solid Reliability: The Stable Solution

Stability and reliability are important attributes shared by all Intel's motherboards, from the Intel® SR440BX desktop board to Intel's Celeron™ processor-based CA810 family. Intel will continue to provide motherboards for the next generations of processors designed for both performance and value.

Industry, analyst, and technical reviews support this position. According to Anand Shimpi at AnandTech.com, a leading online source for PC motherboard reviews:

"Stability seems to be the top priority of Intel with their motherboards, the result? The SR440BX is a motherboard truly deserving of a commendation on the part of its rock-solid stability, even putting (competitive offerings) to shame in terms of overall quality, reliability, and stability."

As a world leader in compatibility testing and a company that holds its component suppliers to 95 percent test coverage requirements, Intel reduces the need for platform developers to test the motherboards themselves. In addition, Intel motherboards implement many of the technologies that the Intel Architecture Labs are driving across a number of initiatives, including the Universal Serial Bus (USB) and Audio Modem Riser (AMR), as well as the FlexATX and microATX form factors, designed to support the Easy PC initiative, as well as provide flexibility for new chassis designs.

Helping to Keep Computing Safe and Secure

Intel has taken the next step forward in safe and secure computing by bundling industry-leading anti-virus and Internet protection software with its motherboards. Offered free of charge, this software includes Symantec's Norton AntiVirus* 5.0, along with a trio of Internet Utilities: Finjan's SurfinShield*, PC Guardian's Encryption Plus* Secure Export, and NovaStor's NovaDisk*.

"As more businesses and individuals engage in commerce on the Internet, share confidential information by email and keep private and financial data on their systems, security of information and protection against loss or leaks becomes essential," said B. C. Ooi, vice president of Intel's Desktop Products Group and general manager of OEM Platform Solutions Division.

"The Intel Motherboard Software program gives system integrators, dealers, and resellers the advantage of supplying system protection software to customers at no cost—software that end users would otherwise be well advised to purchase on their own."

- **Norton AntiVirus 5.0**—Among the top-selling business software in the world, Norton AntiVirus runs constantly on PCs to provide protection from potential system-crippling viruses. It also "quarantines" infected files, and automatically retrieves new anti-virus definitions as Symantec releases them.
- **SurfinShield**—Finjan's SurfinShield helps to protect computer resources from hostile or poorly programmed ActiveX controls and Java applets*. It prevents snooping by providing run-time monitoring and constant vigilance, protecting systems from malicious mobile code attacks or misuse.
- **Encryption Plus Secure Export**—This Internet utility from PC Guardian encrypts data for transmission over the Internet. Encryption Plus Secure Export enables users to send confidential data to others—even if the receiving system does not have special encryption software installed.
- **NovaDisk**—NovaStor's NovaDisk is ideal for safeguarding valuable data on desktops, mobile computers or network clients. It provides automated data backup capabilities that help to protect against potential hardware failures, power outages, natural disasters, and Y2K-related problems.

Easy Installation, Compatibility, and Performance

Ease of installation and compatibility are also important attributes of Intel's motherboards. To make system integration even simpler, each motherboard CD includes a new user interface that eliminates the need to worry about hardware drivers or update files. Glenn Lortscher, Head Web Editor at FPS3D.com, a leading online source of information about gaming systems and technology, recently wrote:

"Overall, installation was probably the easiest and quickest one I have performed in a while...and I do perform motherboard installations a lot! Compatibility is also a very important feature of a motherboard. The SR440BX excels in this area."

Aside from their reliability, safety, ease of installation, and compatibility benefits, Intel motherboards also offer superior performance—always a primary consideration in selecting a motherboard solution. According to Glenn Lortscher at FPS3D.com:

"The SR440BX hauls. It was built to play games, and it completes that purpose beautifully. A good motherboard can make or break a PC, and if you want a solid foundation to build a simple new gaming machine, then this is your choice."

Intel's SR440BX motherboard—which was recently named the winner of [Computer Reseller News' Editor's Choice award](#)—has received similar accolades from other reviewers. You can access their opinions by visiting the Web sites listed at the end of this article.

Support and More

Beyond the many benefits they provide, Intel's motherboards are also backed by a range of support, information, and training services from Intel and its associates. These include a number of product dealer programs that provide platform developers with pre-announcement specifications and early access to samples, enabling them to get a head start in their development efforts. It's all part of Intel's efforts to deliver motherboards that provide a foundation of performance, reliability, and security for today's and tomorrow's expanding array of PC platform solutions.

About the Author

Steve Ashby is a senior product marketing engineer with Intel's Motherboard Division, where his responsibilities include public relations, branding, and other external marketing activities related to Intel's motherboard products.

Alex Quach is a senior product marketing engineer with Intel's Motherboard Division. His responsibilities include defining software products and programs to support the Division's core motherboard business.

For More Information

For more information on Intel's motherboards, including a number of reviews, please go to the following URLs:

[Press Announcement](#)

Intel motherboard product information:

<http://channel.intel.com/business/ibp/boards/>

<http://developer.intel.com/design/motherbd/>

Intel motherboard software and software support:

<http://channel.intel.com/business/ibp/boards/software/index.htm>

<http://support.intel.com/support/>

Computer Reseller News', Editor's Choice Award:

<http://www.crn.com/testcenter/reviews/839/839ec.asp>

Various Reviews (U.S.):

<http://www.fps3d.com/articles/SR440BX/>

http://www.anandtech.com/html/review_display.cfm?document=939

<http://www.gamespot.com/hardware/systems/cpus/se440bx2.html>

Reviews (European press):

<http://www.crn.co.uk>

How to Implement USB Wakeup from ACPI Suspend-to-RAM (S3)

By Jerzy Kolinski
System Architect
Intel Corporation

PCs featuring the PIIX4 I/O bridge do not support the ACPI (Advanced Configuration and Power Interface) S3 state (suspend-to-RAM) with wake-up for USB devices. Intel's integrated controller hub (ICH) products make it possible to design systems that support USB wakeup from S3.

PCs featuring the PIIX4 I/O bridge do not support the ACPI (Advanced Configuration and Power Interface) S3 state (suspend-to-RAM) with wakeup for USB devices such as keyboards, mice or modems. With the introduction of Intel's 82801AA integrated controller hub (ICH) and 82801AB (ICH0) I/O controllers, you can now design systems that support USB wakeup from the S3 state.

These new components include the wakeup logic of the USB controller as part of the resume well of the I/O controller. The USB wakeup logic is powered from the auxiliary power source to detect USB S3 wakeup events.

Design Requirements

Implementing USB wakeup from the ACPI S3 state requires an ICH I/O controller and a power supply with a minimum capacity of 720 mA. It is also important to design the power delivery system to provide USB devices with 5V power while they are in the S3 state. In addition, there must be enough standby power available from the power supply to ensure reliable system operation. You can accomplish this by using a power supply that has extended 5V standby capacity, or by using power budgeting capability.

Recommended: USB Ports Maintain Power During S3

Figure 1 shows a recommended dual-mode power delivery subsystem that provides power to the USB ports while the system is in the S3 state. The dual-mode subsystem contains switches that deliver main power from the Vcc 5V rail in the S0, S1, and S2 states, and power from the 5V standby rail in the S3 state (also in S4).

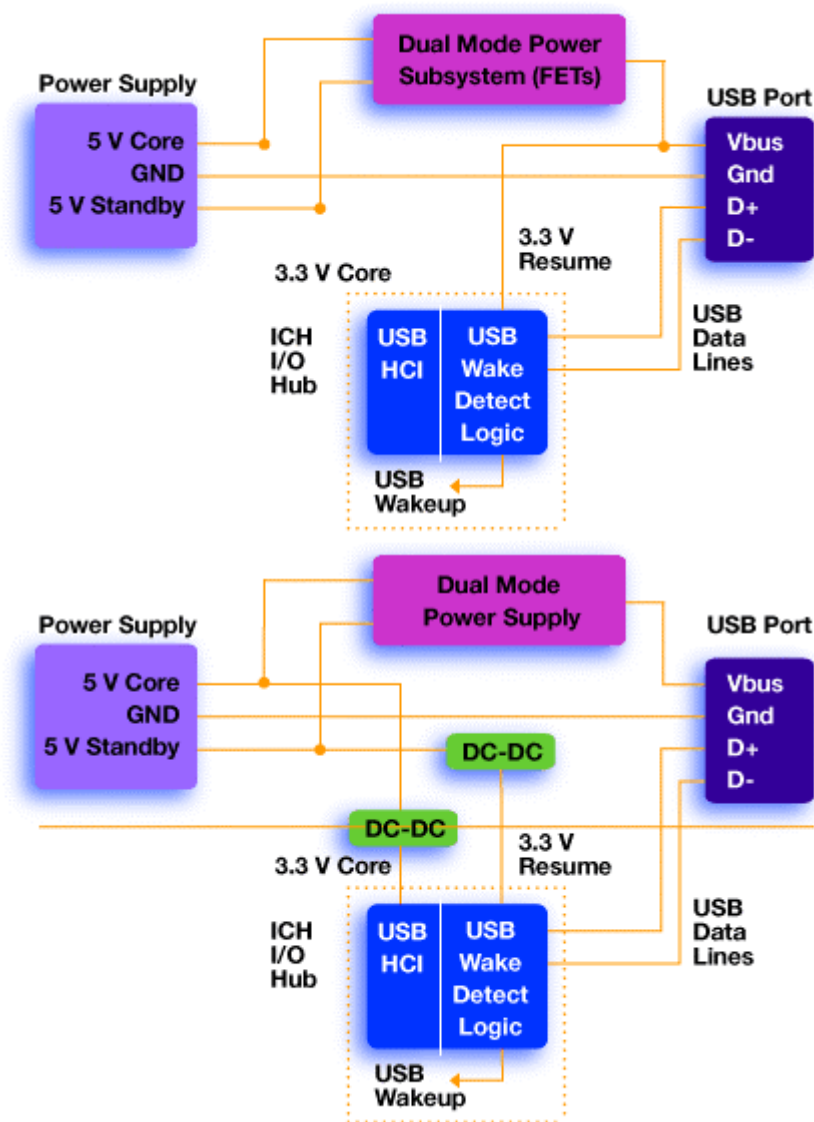


Figure 1: USB Ports maintain power during S3

Power Budgeting

Repeated measurements indicate that most PCI and USB devices actually draw much less power than the maximums defined by the PCI and USB specifications. Actual power dissipation readings show that it is safe to design systems with 720 mA power supplies that have power budgeting capability. Power budgeting ensures that no more than 720 mA will be drawn from the power supply.

Power budgeting capability reads the PCI and USB configuration to determine the required power needed to safely enter and exit the S3 state. If there is not enough available power, the system could enter the S1 state instead of the S3 state. For more information on power budgeting see [Power Budgeting Software Protects the Instantly Available PC](#).

Design Issues and Suggestions

In some designs, the USB ports lose power when the system enters the S3 state. In these systems, the connection of bus-powered USB devices can prevent the system from entering S3. When a bus-powered USB device is plugged into a USB port, the system enters S3 and then immediately resumes, effectively disabling the use of S3 on the platform. This behavior is due to the integrated controller hub detecting a valid disconnect event as power is removed from the USB port. The behavior of the USB D+/D- signals is identical to what would be observed when a bus-powered USB device is disconnected from the USB port. This issue does not arise if there are self-powered USB devices connected to the USB port, or if USB ports remain powered at the time the system is placed into S3.

Intel White Paper Available

Intel has published a white paper entitled [Implementing USB Wakeup & ACPI S3 on ICH-based Systems](#) that contains recommended requirements for designing systems that support USB wakeup from ACPI suspend-to-RAM. The white paper also contains a suggested workaround to ensure reliable system operation and avoid the resume from S3 issue with bus-powered USB peripherals.

Design to Support USB Wakeup from ACPI S3

The availability of Intel's 82801AA integrated controller hub (ICH) and 82801AB (ICH0) I/O controllers make suspend-to-RAM possible for the first time with USB-enabled systems. Intel's recommendations for motherboard design and power management can simplify your designs.

About the Author

Jerzy Kolinski is a systems architect at Intel's Platform Architecture Lab. He is part of Intel's corporate task force responsible for developing new architecture to enable standardized desktop power management with reduced resume latency. Prior to his involvement in power-management architecture, Jerzy led design teams developing Intel® Pentium processor and Intel® Pentium® II processor desktop and server systems.

For More Information

For information on designing motherboards with the dual-mode power delivery circuit, download the file from the [Instantly Available](#) Web site.

High-end Server Validation: Are You Ready for the Next Generation?

By Dan Carter
Sr. Program Manager
Corollary, Inc.

High-performance Intel-based servers are used in mission-critical business environments, and users expect a high level of server reliability. Here are some suggested ways to plan a validation program that saves time and money.

Prior to production, most products go through some type of testing to make sure they perform as intended and meet their design specifications. High-performance Intel-based servers are no exception. Since these servers are used in mission-critical business environments, customers expect a high level of server reliability and availability. To deliver what customers are looking for, server OEMs should go the extra mile to ensure their systems will perform reliably. The ability to meet reliability expectations can have a profound impact on how well a new server will sell on an OEM's reputation with customers.

High-performance servers function in extremely demanding environments, so it's necessary for validation tests to push the envelope and stress your new systems to their limits. The problem is that server capabilities are evolving rapidly, and unless validation tests keep pace, they may not be equal to the job.

To ensure that your systems meet expectations for reliability, your validation test procedures should evolve in parallel with advances in server performance. In fact, test procedures should be carefully planned and prepared in advance so that they are ready for testing prototype units. Here are some suggested factors you should consider in planning tests to validate next-generation server products.

Planning Your Validation Program

To avoid cutting corners, you should focus on the logistics of test planning. This involves two fundamental considerations. First, of course, is to allow enough time to perform the tests. Then make sure there is room in your budget for capital equipment, and allow sufficient time for its acquisition.

Some types of stress tests remain essentially constant from system to system. For example, testing at the extremes of voltage and temperature ranges, temperature cycling, and testing variations in the clock frequency have not significantly changed through the years. These tests continue to be valuable because they can pinpoint marginal areas of the system design early in the development process.

While some tests may remain unchanged, other types of stress tests are subject to continuous evolution in order to keep pace with the growing system requirements of high-end servers. Some of these tests include CPU stress, memory bandwidth, and I/O bandwidth.

CPU Stress

Bear in mind that a test program that creates 100 percent utilization on a single CPU at 400 MHz may not achieve full utilization on a 500-MHz CPU. Similarly, a test program that stresses a dual-processor configuration is usually not adequate for a 4-way or an 8-way system. A more capable stress program or script may often need to be developed. Preparing it prior to the availability of system prototypes allows you to do your testing early in the debug cycle.

Memory Tests

Memory stress tests can take a variety of forms. For example, a cache-thrashing test that works well for a 512-Kbyte cache may not be as effective at thrashing a 2-Mbyte cache.

As you plan your memory test project, you should consider the following questions:

- If the system supports 32 Gbytes of memory, will your test program access all of it and exercise all of the memory cycles?
- Will your stress test include a configuration that can drive the memory to its maximum bandwidth?
- Have you made room in your budget for enough memory components to fill all the test systems that you intend to run?

I/O Bandwidth

I/O testing should stress more than just the I/O bandwidth of the system. It should also create a realistic server I/O environment. Depending on the application, a realistic environment may require a variety of I/O sources, mixed with a device capable of creating burst transactions up to the maximum bandwidth of the system. Of course this does not eliminate the requirement to create a separate test that exercises sustained maximum bandwidth.

Test Maximum Configurations

To push high-end servers to their capacity, you should test them with all of their optional expansion slots filled. This includes planning on a maximum configuration of network cards and RAID controllers. Here's an important reminder: be sure to budget for the cost of the actual RAID drive arrays you will need to create the stress. Acquisition of RAID drive arrays can represent a significant capital expenditure for your test program. Finally, make sure that you plan for the number of systems you will need to perform the validation.

Saving Time vs. Saving Money

Experience shows that schedules can get compressed late in the development cycle to compensate for earlier project delays. Time and budget constraints sometimes make it necessary to choose between saving time and saving money in your validation program. Choosing a serialized approach using fewer systems can help you control validation project costs. On the other hand a parallel approach using more systems can shorten the time needed to complete the validation plan. If you are inclined to limit project costs, don't forget to take into consideration the potential cost of delays in getting your product to market. Time-to-market delays can potentially cost more than the cost of the additional systems required for the faster, parallel validation approach.

Three Things That All Good Plans Include

The performance of high-end servers continues to grow, obsoleting some of the stress testing methods that have been used to evaluate earlier-generation products. While performance is important, server reliability can be even more critical to users.

Server OEMs should be aware of the need for rigorous software testing as well as the hardware configurations required to validate their new machines. All good validation plans include three essentials: a realistic assessment of the time required to develop the software needed for stress testing, budgeting for capital expenses, and time to acquire the components needed to implement your plan.

About the Author

In January of this year Dan Carter joined Corollary Inc., a wholly-owned subsidiary of Intel that is developing the Profusion™ chipset for high-performance servers. Prior to joining Corollary, Dan worked with AST Computers for 15 years where he was responsible for desktop engineering.

Technology News Bytes

June 25

[New Intel® CA810 Motherboard Packs Performance, 3-D Graphics, Audio, and Protection into Value-Priced Package](#)

Intel announced the Intel® CA810 motherboard, a MicroATX form factor product that incorporates the recently announced Intel 810 chipset, a major advancement in chipset technology that integrates Intel 3-D graphics with Direct AGP. The CA810 Motherboard combines the 810 chipset with an on-board Creative Labs® SoundBlaster® PCI audio subsystem and an optional Intel 82559 LAN controller. It also supports Intel's Suspend-to-RAM technology and includes a selection of premium antivirus and Internet protection software.

June 22

[Intel 64 Fund Announces Initial Investments in Emerging Technology Companies](#)

Intel announced the first five equity investments made by the Intel 64 Fund in technology companies committed to developing products for the IA-64 product family. In addition, Intel announced that The Boeing Company and Enron have joined the group of corporate users participating in the Intel 64 Fund.

[Craig Barrett and Bill Gates to Host Intel Microsoft Workstation Leadership Forum in Burlingame, Calif. June 30-July 1, 1999](#)

Intel CEO Craig Barrett and Microsoft Chairman and CEO Bill Gates kick off the Intel Microsoft Workstation Leadership Forum In Burlingame, Calif. conference with keynotes and a joint Q&A on Wednesday, June 30. Barrett and Gates will be discussing the two companies' future product plans for the high-end workstation market.

June 21

[Hughes Network Systems and Intel Collaborate to Bring Interactive TV and Web Capabilities to Living Room](#)

Hughes Network Systems (HNS) and Intel announced that they will collaborate on a wide range of Hughes-built digital satellite set-top products based on Intel Architecture microprocessors and other Intel and HNS technologies.

June 14

[Intel Enhances Mobile PC Performance with Two New Processors](#)

Intel has introduced the mobile Pentium® II and Intel® Celeron™ processors at 400 MHz, two products that bring leading performance and features to the mobile market segment. The mobile Pentium II processor at 400 MHz is Intel's first processor built using Intel's 0.18 micron manufacturing process.

June 11

[Intel Launches PC Motherboard Software Program to Enhance Antivirus, Internet Protection](#)

Intel has announced a new, bundled software program to make premium antivirus and Internet protection software available free with Intel® boxed motherboards. The new program adds value to systems based on Intel motherboards delivered by Intel Product Dealers, OEMs, integrators, and resellers. It offers fully functional versions of software from Internet protection software leaders Symantec Corporation, NovaStor Corporation, PC Guardian, Inc. and Finjan Software, Inc.

June 9

[Intel Activates Its 300 Millimeter Wafer Program](#)

Intel is activating its 300 millimeter (mm) wafer development program. The larger wafer size represents more than a doubling of the silicon wafer's surface versus today's standard 200 mm wafer. The use of 300 mm wafers is expected to cut high-volume chip fabrication cost by 30 percent when compared with 200 mm wafer production costs. Intel plans to start 300 mm production on a 0.13 micron process with copper metallization in 2002, about one year after it begins 0.13 micron production on 200 mm wafers.

June 8**[PBS and Intel Collaborate on Around-the-Clock Data Enhancements for PBS Programming](#)**

The Public Broadcasting Service (PBS) and Intel have announced a new collaboration to enable PBS to broadcast enhanced digital television (DTV) content 24 hours a day and to simplify production of enhanced DTV programs. The first enhanced DTV programming, to be offered for use by PBS member stations, will begin airing in April 2000. The new enhanced content will take advantage of increased digital bandwidth to offer viewers programming with rich video, graphics and educational applications through PCs capable of receiving the DTV signal.

June 7**[Intel Brings Web-Based System Management to the PC](#)**

Intel has announced Intel® LANDesk® Client Manager 6, the next-generation solution for Web-based PC management. Built upon a new, fully Web-enabled architecture, Intel LANDesk Client Manager 6 provides system administrators with access to PC health, system assets, troubleshooting, problem resolution, and desktop management information from any console connected to the Internet or a corporate Intranet.

[Intel Fortifies System Management](#)

Intel has announced the release of Intel® LANDesk® Management Suite 6.3, the latest version of the premier systems management solution for heterogeneous operating environments. Intel LANDesk Management Suite 6.3 extends its Web-based architecture to include Web-based reporting of system information. It delivers heightened scalability to provide support for large, networked systems.

June 2**[New Intel® Persistent Storage Manager Simplifies Designs Using Windows* CE](#)**

Intel has announced Intel® Persistent Storage Manager, a flash memory software solution that simplifies system design by combining all non-volatile memory functions into a single memory chip solution.

[Intel and Industry Leaders Complete Draft of Interoperability Guide for IA-64 Platform](#)

Intel and leading hardware and software vendors have begun industry review of interoperability guidelines for Intel's IA-64 computing platform architecture. The Developer's Interface Guide, or DIG64, will accelerate the availability of IA-64 system solutions by addressing compatibility of hardware- and system-level software and related development efforts. The first IA-64-based solutions beginning with the Merced processor are expected to be available in mid-2000.

[Intel Acquisition of Level One Communications to Close in the Third Quarter](#)

Intel and Level One Communications, Incorporated (NASDAQ:LEVL) have jointly announced that the previously announced acquisition of Level One by Intel is now expected to close in the third quarter. The companies said that Level One has filed its confidential proxy statement with the Securities and Exchange Commission and the parties are currently responding to SEC comments.

June 1**[Intel to Acquire Dialogic for Approximately \\$780 Million](#)**

Intel and Dialogic Corporation today announced that they have entered into a definitive agreement under which Intel would acquire Dialogic for \$44 per share in an all-cash tender offer valued at approximately \$780 million. The acquisition is aimed at expanding Intel's standard-high-volume (SHV) server business in the multibillion-dollar networking and telecommunications market segment by providing industry vendors with standards-based hardware and software building blocks for integrated voice and data networks.

May 26**[Intel, HP Reveal IA-64 Instruction Set Architecture](#)**

Intel and Hewlett-Packard Company have published the details of the IA-64 Instruction Set Architecture (ISA). This disclosure enables software developers from around the world to accelerate the development of the next generation of server and workstation applications based on forthcoming IA-64 processors, beginning with Merced in 2000.

May 25**[Applied Computing Applications Get Performance Boost from Intel® Pentium® II Processor-Low Power](#)**

Intel has announced it has added the Intel® Pentium® II processor-Low Power and free system software, development kit, and boards available from third party vendors to its platform solutions. These processors are targeted to an emerging class of dedicated-function applications, called applied computing, that are typically connected to other systems via a network or through the Internet.

Industry Events

July Events

- [Intel/ESPN Co-broadcast of the Summer '99 X-Games Webcast*](#)
- [Inprise and Borland Conference](#)
- [CA-World 1999](#)
- [Informix Worldwide User Conference](#)

August Events

- [Wired for Management Summit '99](#)
- [SIGGRAPH 99](#)
- [The CIO 100 Symposium & Awards](#)
- [Hot Chips Conference](#)
- [Intel Developer Forum \(IDF\)](#)
- [Seybold San Francisco 21st Century Publishing](#)

Industry Events for July

Intel/ESPN Co-broadcast of the Summer '99 X-Games Webcast*

June 25 – July 3

The X-Games* are an annual competition involving “extreme” sports like bicycle stunts, aggressive inline skating, skateboarding and snowboarding to name a few. Using Intel® Streaming Web Video software in RealSystem* G2, ESPN-TV and the Intel Architecture Labs Internet Media initiative bring viewers live and unedited extreme sports action on the Web for the first time ever.

Inprise and Borland Conference

July 17-21

Philadelphia, PA

The 10th Annual Inprise and borland.com Conference is for independent developers building custom solutions, tools, and components, for IT managers, and for developers creating large enterprise applications. This conference gives you the chance to meet with and learn from the brightest minds in the industry by designing your own curriculum from more than 200 sessions led by industry experts. You can mix and match sessions to focus on your specific needs. You'll discover hundreds of the latest developer and management tips and techniques. Learn how to exploit new technologies and manage projects on Internet time.

CA-World 1999

July 18-23

New Orleans, LA

Computer Associates International, Inc. presents CA-World 1999 as the premier user education technology conference and exposition in the IT industry. It offers over 3,000 technical sessions and hands on labs plus a free PreConference Education series. Topics covered will be applications and database development, systems and network administration, Year 2000 conversion, object oriented database management, security, and Internet/Intranet technologies. Intel will have a booth at CA World and will be demonstrating managed platforms and Wired for Management technologies. Intel president Craig Barrett and chairman of the board Andy Grove will be keynote speakers.

Informix Worldwide User Conference (IWUC)

July 19-22

San Diego, Convention Center

San Diego, CA

IWUC '99 is the place to learn and share with other technology-savvy IT leaders about database powered solutions for OLTP, e-commerce and data warehousing. Join over 3,000 business and technology professionals from industries including telecommunications, retail, financial services, healthcare, broadcast and publishing markets in the interactive forum of leading global companies and people.

Industry Events for August**Wired for Management Summit '99**

August 2, 1999

Santa Clara Convention Center

Santa Clara, CA

If you're an IT professional, manager or executive with responsibility for managing PCs, Intel's Wired for Management Summit '99 can show you how Wired for Management (WfM) enhanced products can improve management of complex computing environments and reduce Total Cost of Ownership (TCO). You'll see case histories from large corporations using WfM-enhanced solutions and hear how these companies are using real-world products to increase their strategic focus and improve their organizations' competitive agility. A Solutions Showcase will offer hands-on demonstrations by leading system management companies. The Summit will feature an exciting, informative live event including a keynote by an industry analyst with the GartnerGroup.

SIGGRAPH 99

August 8-13, 1999

Los Angeles Convention Center

Los Angeles, CA

ACM's annual gathering for its Special Interest Group on Graphics has become the world's epicenter of computer graphics and interactive technologies, with hundreds of companies offering thousand of products and services for the new century. SIGGRAPH 99 offers developers the opportunity to see, explore, and interact with essential tools and techniques produced by today's world trendsetters and tomorrow's upstart innovators. Intel will have a major presence at this year's conference, with special demonstrations of its workstation, server, and graphics products and technologies.

The CIO 100 Symposium & Awards

August 15-18

Hotel del Coronado

San Diego, CA

The CIO 100 Symposium & Awards is a three-day program focusing on Leadership and Innovation for the Future of the Enterprise. Through interactive presentations and discussions, the Symposium brings to life and honors the achievements of 100 industry-leading enterprises. Intel and its Enterprise Server Group will be participating.

Hot Chips Conference

August 15-17

Stanford University

Palo Alto, CA

Since its beginning in 1989 Hot Chips has become one of the leading conferences in the microprocessor/microcomputer field. Its emphasis is on real products and real technology. Hot Chips is sponsored by the IEEE Computer Society, Technical Committee on Microprocessors and Microcomputers.

Intel Developer Forum (IDF)

August 31-Sept 2

Palm Springs Convention Center

Palm Springs, CA

Three full of in-depth presentations, demonstrations and dialogue with Intel's chief technology architects, plus third party luminaries will give you a head start for designing platform for the new millennium. The Intel Developer Forum covers today's implementation details and tomorrow's technology roadmaps to keep you up-to-date on the latest desktop, workstation, server, and mobile platforms and embedded technologies including:

- IA-64—emerging Internet server technology
- Enabling trusted Internet access and e-commerce—year 2000 security roadmap
- Intranet/enterprise clients and servers
- Software tools for authoring rich Internet content and applications
- Easy-to-use PCs and home networking—bringing Internet access to every room in the home
- Next-generation StrongARM* solutions—Internet applications and digital companions
- Improving and extending Internet connectivity—broadband, wireless
- USB 2.0—higher bandwidth connectivity for PC peripherals

Keynotes will be delivered by Intel's top executives and will provide perspectives on how these technologies are shaping the PC Industry.

Seybold San Francisco 21st Century Publishing

August 30- Sept 3

San Francisco, CA

Each day of SSF has something to help you do your job better, make more money, or understand how your business environment is going to change. The focus will be on the open exploration of the key issues and the introduction of new concepts and technologies for the electronic publishing process, with clues to the direction the industry will be taking. Tracks include the state of Internet design and technology, optimal server architecture, connectivity, mixed-platform environments, and digital imaging.

—End of Platform Solutions Issue 21—